IOWA Learning Farm Newsletter

Mission Statement

The Iowa Learning Farm promotes efficient agriculture production systems that result in agronomic, economic, and environmental improvements through increased awareness and adoption of conservation systems and ethics.

Students look for soybean aphids at the Rob Stout field day.

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One Busy Summer

Team members with the Iowa Learning Farm project were busy crisscrossing the state this summer hosting field days, demonstrating the conservation system's rainfall simulator and presenting at various conferences and meetings.

Matt Helmers, ISU Extension water quality engineer, is in charge of the rainfall simulator. Helmers and agricultural engineering senior Brad Bond demonstrated the simulator, educating the public about the impacts of rainfall on Iowa's landscape, at 14 county and regional fairs, four youth science and environmental events, and farmers markets in Ames and Des Moines.

"People really enjoy the rainfall simulator," remarked Helmers. "It delivers a simple but potent message, that if we don't slow the flow, Iowa's rich land will no longer be here." And people have been fascinated by cool water on a hot Iowa day.

The ILF hosted six field days this summer on cooperator farms. Several hundred people attended the programs to discuss the latest topics ranging from no-till continuous corn, cover crops, soybean aphids, and CRP conversions. Cooperators who hosted field days include: Joel and Linda Zwiefel (Palo Alto), Mike Deahr and Doug Nolte (Muscatine), Rob Stout (Washington), Randy Caviness (Adair), Doug Campbell (Ringgold), and Jerry Crew (Clay).

Team members also presented at several conferences including the Leopold Center for Sustainable Agriculture's 20th Anniversary Conference, the Midwest Strip-Till Expo, RAGBRAI, and numerous meetings of various conservation agencies. The ILF hosted a special field day for conservation groups, legislators, agribusiness and partners at the Smeltzer demonstration farm, rural Otho. Special guest at this event was Iowa Secretary of Agriculture Bill Northey.

Outreach and education are important components of the Iowa Learning Farm project. The ILF team goal is to build a Culture of Conservation, providing educational opportunities and programs where our cooperators share conservation ideas with, and learn from, other farmers. ISU Extension experts provide technical assistance to the learning network.

Brad Bond (left) demonstrates the rainfall simulator at the Des Moines Farmers Market.

Mahdi Al-Kaisi discusses tillage practices at the Jerry Crew field day.

Attendees at the Doug Campbell field day enjoy a meal while listening to the presentation.

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Mike Deahr

Producer Profile

Iowa Learning Farm cooperator and first-generation producer Mike Deahr farms in Muscatine County. As a boy, Deahr cultivated his interest in farming by reading agricultural magazines. In the 1980s Mike, and his wife Susan, had the opportunity to buy land and begin farming. They became conservationists shortly after that.

"I have had a long-time love with the creek on my land," said Deahr. "When we first moved to the farm, I bought a couple of cows. At that time, the local municipality wasn't doing a good job keeping the water free of human sewage. One of my cows died in the creek. I became a conservationist because of the death of my cow."

With a hog operation of 2,800 sows and 1,000 acres in row crops, the Deahrs are "activist" farmers. They have traveled to Washington, D.C. and Des Moines to lobby for conservation. Susan, who grew up on a farm, was enrolled in Annie's Project that helps farm women be better business partners. She handles the operation's book work.

The Deahrs joined ILF in 2006 to learn new ideas and techniques in using manure more effectively. Their demonstration site compares manure application with the addition of three different rates of commercial fertilizer.

Mike also serves on the Iowa Pork Board, the Muscatine County Soil and Water Commission and the county zoning board.

Biomass Harvest and Transportation

By Mark Hanna, Extension Agricultural Engineer; and Stuart Birrell, Associate Professor, Agricultural and Biosystems Engineering, Iowa State University

Increased worldwide demand for fuel and other petroleum-based products have renewed interest in using agricultural bioproducts, non-grain biomass as well as grain, as feedstocks in place of foreign oil. Farmers and others involved in agriculture want to position themselves and their communities to take advantage of this new opportunity. Corn biomass includes the stalk, cob, leaves and husks, and for harvesting purposes often is considered to be the non-grain above-ground portion of the plant.

The design of biorefineries depends on the end-use product. In cases of unproven technology their design may still be scaling-up from pilot-plant operation, but the economics of current business models often desire biomass to be delivered at the plant gate at a cost $30-35 per ton. Various feedstock crops are possible (e.g. switchgrass, etc.), but this discussion will be limited to corn.

Concepts of biomass harvesting

Two-pass harvesting: Biomass from grain traditionally has been harvested as part of a two-pass system. A combine harvests grain and a baler harvests stalks, leaves and other material usually left windrowed behind the combine. Advantages of this system are that equipment is readily available and operation is familiar. Significant drawbacks limit its long-term feasibility. A uniform biomass product is highly desirable and soil collected during operation of the baler pick-up significantly interferes with later processing steps within many biorefineries. On-farm labor, usually limited during harvest, is doubled with baler collection.

Single-pass harvesting: This concept is to harvest both biomass as well as grain in the same field pass. Most current concepts involve some modification of grain combine harvest. Several options are possible.

One scenario is to collect cob pieces and corn mixed in the combine grain tank. A few cattle feeders have used this process for years. The harvested grain/cob mix increases the volume of material carried away from the combine and must be separated either on-farm or at the biorefinery. Storage of a grain/cob mix for a significant length of time could be problematic because cobs may be wetter than the grain. Cracking of seed coats with aggressive threshing (acceptable for cattle feeding) degrades grain quality and has the potential for storage problems, particularly with the possibility of increased disease presence in corn-on-corn fields.

A second scenario is to collect the material other than grain exiting at the rear of the combine. This process takes advantage of the combine's inherent ability to separate grain from biomass, keeping the material as a separate stream. Researchers at ISU's Agricultural and Biosystems Engineering Department have demonstrated the technical feasibility of adding a chopper for fine residue cutting at the rear of the combine and blowing the material into a trailing forage wagon. Biomass is separated from the grain and transported separately from the

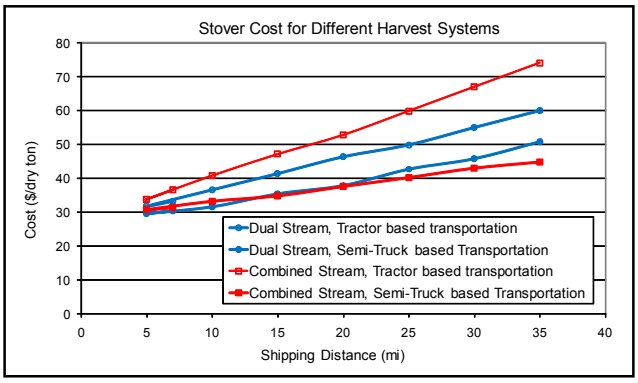
field. Biomass needs to be cut significantly finer than with a traditional rear-mounted combine chopper to increase density of material for transport, this markedly increasing the combine's chopper power requirements.

Other scenarios exist, particularly if only cob collection is desired. Ear-corn harvest systems are familiar to many, but this system doubles the volume of material handled and carried away from the field. Additional processing is required after the ear-corn leaves the field.

A number of newer biorefineries that envision using non-grain biomass are still in the development stage. They may use only a portion of the biomass (e.g. corn cobs). Uniform material is desirable for processing but the desired size is still uncertain and only will be determined as full-scale plants come on line. Desirable size is impacted by both transportation and processing at the biorefinery.

Transportation issues

Large-scale biorefineries require large amounts of biomaterial for year-round operation. Current planning of some business models suggests biomass may need to be collected from fields up to a 50-mile radius from the plant. Public right-of-way restrictions generally limit truckloads to 80,000 lb. gross vehicle weight with freight. Stalks and most non-grain material are not dense enough to make an economical load. Fine-chopping and compaction prior to transport helps, but requires additional energy. Mixing grain within the biomass would help to make an economical load, but it must be separated later. At distances beyond 15 miles from the biorefinery, transportation costs from lower density loads become a significant part of total biomass costs delivered at the biorefinery gate.



Processor issues

The biorefinery industry is in the early stage. As processing scales up, the desirable size, shape and/or condition of biomass received at the plant may change. Should grain and biomass be separated in the field, at the farm, or at the bioprocessor? Biomass will be required year-round for plant operation. Is off-season storage accomplished by the farmer, a middleman/broker, or by the processor? And how much biomass may be safely removed from individual fields without adversely impacting soil health? Sloping land, soils with lower P or K, or fields low in organic matter will be more adversely impacted if significant amounts of crop residue are harvested.

Growers will want to carefully consider harvest, transportation, and storage implications requested by the biorefinery as they evaluate business opportunities. Because of the low-density nature of biomass and potential hauling distances involved, transportation costs including densification as well as logistics may be as or more significant than harvest or storage costs. In-field value of the biomass for soil health, fertility and erosion control, in relation to the percentage of material harvested should be evaluated. Growers should carefully consider local marketing opportunities that may influence future equipment purchases and overall farm business planning.

Building a Culture of Conservation

Building a Culture of Conservation involves strengthening our commitment to the importance of natural resources to our quality of life. The Iowa Learning Farm takes a grassroots approach to promote innovative ways to help all Iowans have an active role in protecting our natural resources. In this space we will illustrate various ways that you can help "Build a Culture of Conservation."

One way to create a Culture of Conservation is to renew the *art of neighboring*—where people know one another, share stories and truly begin to communicate. This begins with "agents of change," persons or groups who bring together the following people in their community:

- The Connector: the person who knows a lot of people, genuinely likes others and are liked in return.
- Local Specialists: persons who know about local issues and are motivated to educate and help.
- Salesperson: the person who is good at persuading others to a cause.*

Our cooperators serve as agents of change by communicating with peers, neighbors and community groups about what they are doing to conserve the natural resources on their land. You can serve as a speaker or organize a panel of specialists for local programs through ISU Extension, service clubs or libraries. By speaking passionately and straightforwardly, practically and personally, your message will be remembered and can move others to action.

For ideas on how to be an "agent of change" to help others understand how their actions affect land and water quality issues, contact the Iowa Learning Farm. We can share ideas, materials and suggestions to help you get started in the dialog to build a Culture of Conservation.

**The Tipping Point,* by Malcolm Gladwell

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Thinking about cover crops?

If you are considering adding cover crops to your rotation this fall, now is the time to gather information to make a decision.

Winter-hardy cultivars of rye, wheat and triticale will provide cover in the fall and spring to protect the soil against erosion. Small grain cover crops should be planted as soon as possible after harvest and ideally before October 15.

To minimize any potential yield effects on the following crop, cover crops should be killed either chemically or mechanically at least two weeks before planting the next crop.

Benefits of Cover Crops:

- Reduce soil erosion by increasing surface cover
- Limit nitrogen leaching
- Suppress weeds
- Increase soil organic matter

Additional resources on utilizing cover crops can be found at the following link on the Leopold Center for Sustainable Agriculture website:
http://www.leopold.iastate.edu/research/eco_files/cover_crops.htm

USDA researcher Jeremy Singer, an expert on cover crop use and establishment, is based at the National Soil Tilth Laboratory on the ISU campus. He welcomes your questions at (515) 294-5502, or via e-mail: jeremy.singer@ars.usda.gov.